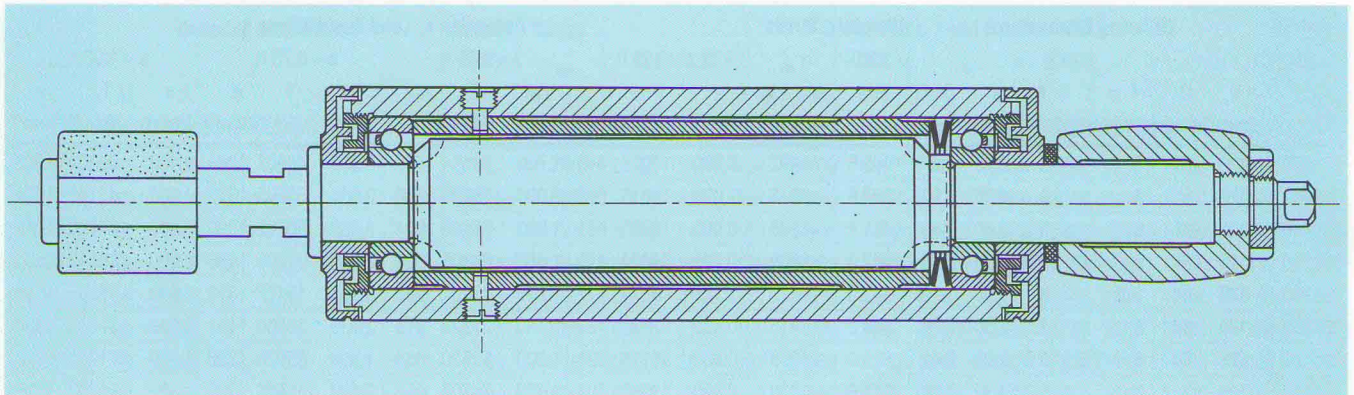


## The optimal completion for ball bearings



Application example

Two problems continually occupy design engineers, the reduction in noise and the elimination of play in ball bearings. A solution to both these problems has been achieved by our company working in close cooperation with SKF. The fitting of a special version of our Disc Spring effectively reduces both problems and frequently results in simpler designs.

### Application of "K" Disc Springs

The typical assembly drawing illustrates how the outer ring of the bearing can be correctly preloaded using a "K" Disc Spring. Depending on the requirements of the design, one or more "K" Disc Springs can be used. There are instances where it is preferable to preload the inner ring of the bearing.

Therefore all "K" Disc Springs with the outer diameter suitable for one size of bearing will also fit the inner diameter of another size bearing. For example, a "K" Disc Spring which is designed for preloading the outer ring of size 6302 bearing can also be used to preload

the inner ring of a size 6205 or 6305.

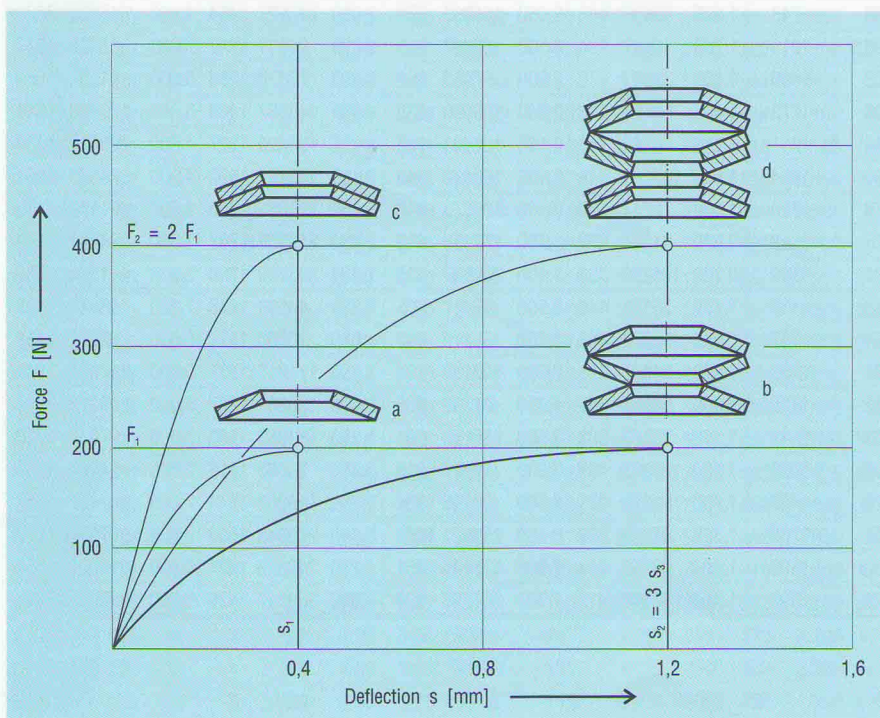
### Important benefits of "K" Disc Springs

An important advantage of "K" Disc Springs is their shape of a simple ring. This ensures, the load they apply to the bearing is distributed evenly around the bearing ring. Additional movement at constant load can be provided by arranging the springs in alternate direction (single series "b"). Conversely, additional load can be applied at constant spring deflection when springs are arranged to face the same direction (parallel stacking "c"). This also applies to conventional Disc Springs.

As all springs are designed to have a highly degressive characteristic (large  $h_0/t$ ), spring load remains nearly constant for large spring deflection. This gives several advantages:

- The tolerance built up in the assembly can be accommodated without significant change in preload as can length variations through differential expansion.
- Any subsequent axial movement of the assembly does not alter the preload significantly.

The use of SCHNORR® "K" Disc Springs not only eliminates the original axial play but also brings other benefits to the assembly.



## Explanation of the table

The "K" Disc Spring Sizes listed in the following table comply with the ball bearing series EL, R, 62 and 63 which are most frequently used. Springs can also be supplied to other series of ball bearings.

In the table are shown all the springs of our standard production.

The loads and deflections given are at spring deflection 75% of free height  $h_0$ , which is the recommended preload.

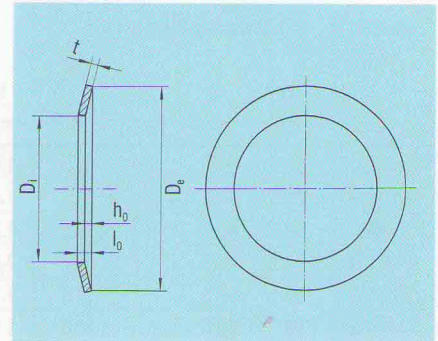
## How to order "K" Disc Springs

When ordering "K" Disc Springs to preload the outer ring of the bearing it is sufficient to quote the bearing size. In all other cases please give application details.

## Slotted springs

We can also supply slotted "K" Disc Springs for a common range of bearing sizes.

When ordering please quote the required bearing size together with the suffix "SLOTTED".



# SCHNORR® "K" Disc Springs

Non-slotted disc springs

Article No.	Ordering Dimensions						Deflection s and Spring Load F at $s \approx 0.75 h_0$		Weight/ 1000 pcs. [kg]	Ball-Bearing Type		Ball-Bearing Dimension		
	$D_o$ [mm]	$D_i$ [mm]	t [mm]	$l_0$ [mm]	$h_0$ [mm]	$h_0/t$	s [mm]	F [N]				Outer dia. [mm]	Inner dia. [mm]	
241200	9.8	6.2	0.2	0.4	0.20	1.00	0.15	23	0.068	623(EL3)	10	3	-	-
241400	12.8	7.2	0.25	0.5	0.25	1.00	0.19	29	0.167	624(EL4)	13	4	-	-
241600	15.8	8.2	0.25	0.55	0.30	1.20	0.23	23	0.275	625(EL5) 634(R4)	16	5	4	-
241700	18.8	9.2	0.3	0.65	0.35	1.17	0.26	31	0.487	626(EL6) 635(R5)	16	6	5	-
241800	18.8	10.2	0.35	0.7	0.35	1.00	0.26	51	0.526	607(EL7)	19	7	-	-
241900	21.8	12.3	0.35	0.75	0.40	1.14	0.30	46	0.684	608(EL8) 627(R7)	22	8	7	-
242100	23.7	14.3	0.4	0.9	0.50	1.25	0.38	81	0.862	609(EL9)	24	9	-	-
242200	25.7	14.3	0.4	0.9	0.50	1.25	0.38	63	1.105	6000 629(R9)	26	10	9	-
242300	27.7	17.3	0.4	1	0.60	1.50	0.45	80	1.132	6001	28	12	-	-
242500	29.7	17.4	0.4	1.1	0.70	1.75	0.53	83	1.406	6200	30	-	10	-
242600	31.7	20.4	0.4	1.1	0.70	1.75	0.53	81	1.422	6002 6201	32	15	12	-
242800	34.6	20.4	0.4	1.1	0.70	1.75	0.53	61	1.894	6300	35	-	-	10
242900	34.6	22.4	0.5	1.2	0.70	1.40	0.53	118	2.103	6003 6202	35	17	15	-
243000	36.6	20.4	0.5	1.3	0.80	1.60	0.60	110	2.805	6301	37	-	-	12
243100	39.6	25.5	0.5	1.3	0.80	1.60	0.60	110	2.783	6203	40	-	17	-
243200	41.6	25.5	0.5	1.4	0.90	1.80	0.68	113	3.282	6004 6302	42	20	-	15
243300	46.5	30.5	0.6	1.5	0.90	1.50	0.68	153	4.486	6005 6204 6303	47	25	20	17
243400	51.5	35.5	0.6	1.5	0.90	1.50	0.68	135	5.059	6205 6304	52	-	25	20
243500	54.5	40.5	0.6	1.5	0.90	1.50	0.68	141	4.822	6006	55	30	-	-
243600	61.5	40.5	0.7	1.8	1.10	1.57	0.83	176	9.121	6007 6206 6305	62	35	30	25
243700	67.5	50.5	0.7	1.7	1.00	1.43	0.75	161	8.505	6008	68	40	-	-
243800	71.5	45.5	0.7	2.1	1.40	2.00	1.05	185	12.99	6306	72	-	-	30
243900	71.5	50.5	0.7	2.1	1.40	2.00	1.05	218	10.90	6207	72	-	35	-
244000	74.5	55.5	0.8	1.9	1.10	1.38	0.83	211	11.99	6009	75	45	-	-
244100	79.5	50.5	0.8	2.3	1.50	1.88	1.13	228	18.40	6307	80	-	-	35
244200	79.5	55.5	0.8	2.3	1.50	1.88	1.13	263	15.78	6010 6208	80	50	40	-



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## Non-slotted disc springs

Article No.	Ordering Dimensions				h <sub>0</sub> [mm]	h <sub>0</sub> /t	Deflection s and Spring Load F at s ≈ 0.75 h <sub>0</sub>		Weight/ 1000 pcs. [kg]	Ball-Bearing Type		Ball-Bearing Dimension				
	D <sub>e</sub> [mm]	D <sub>i</sub> [mm]	t [mm]	l <sub>0</sub> [mm]			s [mm]	F [N]		Outer dia. [mm]	Inner dia. [mm]					
244300	84.5	60.5	0.9	2.5	1.60	1.78	1.20	359	19.05		6209	85	-	45	-	
244400	89.5	60.5	0.9	2.5	1.60	1.78	1.20	288	23.86		6308	90	-	-	40	
244500	89.5	65.5	0.9	2.5	1.60	1.78	1.20	335	20.36	6011	6210	90	55	50	-	
244600	94.5	75.5	1	2.2	1.20	1.20	0.90	325	19.57	6012		95	60	-	-	
244700	99	65.5	1	2.6	1.60	1.60	1.20	292	33.64		6809	100	-	-	45	
244800	99	70.5	1	2.6	1.60	1.60	1.20	332	29.44	6013	6211	100	65	55	-	
244900	109	70.5	1.25	2.7	1.45	1.16	1.09	357	52.80		6310	110	-	-	50	
245000	109	75.5	1.25	2.7	1.45	1.16	1.09	398	47.17	6014	6212	110	70	60	-	
245100	114	90.5	1.25	2.45	1.20	0.96	0.90	398	36.49	6015		115	75	-	-	
245200	119	75.5	1.25	2.8	1.55	1.24	1.16	320	64.71		6311	120	-	-	55	
245300	119	85.5	1.25	2.8	1.55	1.24	1.16	393	52.28		6213	120	-	65	-	
245400	124	90.5	1.25	3	1.75	1.40	1.31	445	54.75	6016	6214	125	80	70	-	
245500	129	85.5	1.25	3.2	1.95	1.56	1.46	405	71.28		6312	130	-	-	60	
245600	129	95.5	1.25	3.2	1.95	1.56	1.46	500	57.31	6017	6215	130	85	75	-	
245700	139	90.5	1.25	3.25	2.00	1.60	1.50	354	85.11		6313	140	-	-	65	
245800	139	101	1.25	3.25	2.00	1.60	1.50	429	69.58	6018	6216	140	90	80	-	
245900	149	95.5	1.5	3.2	1.70	1.13	1.28	379	120.1		6314	150	-	-	70	
246000	149	106	1.5	3.2	1.70	1.13	1.28	450	100.5	6020	6217	150	100	85	-	
246100	159	101	1.5	3.5	2.00	1.33	1.50	412	138.5		6315	160	-	-	75	
246200	159	111	1.5	3.5	2.00	1.33	1.50	477	118.9	6021	6218	160	105	90	-	
246300	169	111	1.5	3.8	2.30	1.53	1.73	470	149.2		6316	170	-	-	80	
246400	169	121	1.5	3.8	2.30	1.53	1.73	546	127.7	6022	6219	170	110	95	-	
246500	179	121	2	4.2	2.20	1.10	1.65	864	213.1		6317	180	-	-	85	
246600	179	126	2	4.2	2.20	1.10	1.65	928	197.8	6024	6220	180	120	100	-	
246700	189	121	2	4.3	2.30	1.15	1.73	759	258.3		6318	190	-	-	90	
246800	189	131	2	4.3	2.30	1.15	1.73	858	227.1		6221	190	-	105	-	
246900	198	131	2	4.5	2.50	1.25	1.88	812	270.0		6319	200	-	-	95	
247000	198	141	2	4.5	2.50	1.25	1.88	923	236.4	6026	6222	200	130	110	-	
247100	213	151	2.25	4.5	2.25	1.00	1.69	941	310.9		6224	6320	215	-	120	100
247200	223	161	2.25	4.6	2.35	1.04	1.76	942	328.0	6030	6321	225	150	-	105	
247300	228	161	2.25	4.95	2.70	1.20	2.03	1036	359.2		6226	230	-	130	-	
247400	238	161	2.25	5.25	3.00	1.33	2.25	1021	423.8	6032	6322	240	160	-	110	
247500	248	171	2.5	5	2.50	1.00	1.88	1005	494.5		6228	250	-	140	-	
247600	258	171	2.5	5.5	3.00	1.20	2.25	1106	572.2	6034	6324	260	170	-	120	
247700	268	181	2.5	5.7	3.20	1.28	2.40	1155	598.7		6230	270	-	150	-	
247800	278	181	2.5	6	3.50	1.40	2.63	1155	682.7	6036	6326	280	180	-	130	
247900	288	191	2.75	5.75	3.00	1.09	2.25	1145	783.7	6038	6232	290	190	160	-	
248000	298	191	2.75	6.35	3.60	1.31	2.70	1307	883.0		6328	300	-	-	140	
248100	308	202	3	6.1	3.10	1.03	2.33	1300	995.2	6040	6234	310	200	170	-	
248200	318	212	3	6.2	3.20	1.07	2.40	1302	1034		6236	6330	320	-	180	150
248300	338	232	3	6.6	3.60	1.20	2.70	1415	1112	6044	6238	6332	340	220	190	160
248400	358	242	3	7	4.00	1.33	3.00	1424	1281	6048	6240	6334	360	240	200	170



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